IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	Eschenburg
Serial No.:	10/725,885
Filed:	December 2, 2003
Group Art Unit:	3682
Examiner:	Kim, Chong Hwa
Title:	MODULAR BEARING CAGE WITH INTEGRATED LUBRICATION PUMP

Mail Stop – Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPEAL BRIEF

Dear Sir:

Appellant submits this Appeal Brief pursuant to the Notice of Appeal filed August 28, 2007. The Commissioner is authorized to charge Deposit Account No. 50-1482 in the name of Carlson, Gaskey & Olds, $510.00 for the appeal brief fee. Any additional fees or credits may be charged or applied to Deposit Account No. 50-1482 in the name of Carlson, Gaskey & Olds.

REAL PARTY IN INTEREST

The real party in interest is ArvinMeritor Technology, LLC, assignee of the present invention.

RELATED APPEALS AND INTERFERENCES

There are no prior or pending appeals, interferences or judicial proceedings related to this appeal, or which may directly affect or may be directly affected by, or have a bearing on, the Board's decision in this appeal.

STATUS OF CLAIMS

Claims 1-11 and 22-29 are pending and stand rejected. Claims 12-21 have been cancelled. Claims 1-11 and 22-29 are the subject of this appeal.

STATUS OF AMENDMENTS

All amendments have been entered.

SUMMARY OF CLAIMED SUBJECT MATTER

Heavy duty gear and axle housings include oil pumps disposed within the housing to direct lubricant to specific driveline components. Prior art housings are specially designed to accommodate the oil pump and the driveline components include some feature to drive the oil pump. The need to custom tailor a housing and internal drive components to accommodate an oil pump increases cost and prevents adaptation to existing housings without an oil pump.

The disclosed axle assembly 10 includes an axle housing 12 for supporting rotation of driven axles. A gear housing 14 is attached to the axle housing 12 and supports driveline components. An input shaft 18 is supported on a first end by a bearing cage supported by a pump housing 16. The pump housing 16 includes an elongated section 60 extending to cover an opening within the gear housing 14. The elongated section 60 includes an inlet 22 that communicates with oil contained within the bottom portion of the gear housing 14. The pump housing 16 includes an attachment boss 24 for an oil filter 25. The disclosed pump is a rotor pump and includes an inner gear 36 and an outer gear 34. Each of the gears 36, 34 are disposed within a reversing ring 35 (Figures 1- 4, page 4, lines 1-16, paragraphs 19-21).

The inner gear 36 is mounted to the input shaft 18. The outer gear 34 is mounted in a non-concentric manner relative to the inner gear 36. The teeth of the inner and outer gears mesh to create progressively reduced volumes that pull oil from the sump through the inlet 22. The reversing ring 35 engages when the input shaft 18 is driven in a reverse direction to allow for the continued pumping of oil. The reversing ring 35 reverses the position of an inlet and outlet to

maintain the direction of oil flow regardless of the direction or rotor pump rotation (Figures 2-4, page 4, lines 16-24, paragraph 21).

The gear case housing 14 includes the input shaft 18 with a first gear 48 driving a second gear 50 disposed on a pinion shaft 52. The input shaft 18 is supported by the bearing cage assembly 30. The bearing cage assembly 30 is supported within the pump housing 16. The elongated portion 60 includes an inlet passage 40. The inlet passage 40 extends downward to the inlet 22. The inlet 22 is in communication with a sump 38 of the gear housing 14 such that the inlet 22 is below the oil level within the sump 38 (Figure 6, page 5, lines 7-13, paragraph 23).

Oil is pulled upward through the inlet 22 and inlet passage 40 by the rotor pump assembly 32. From the rotor pump assembly 32, oil is transmitted through passage 54 to the oil filter 25. A relief valve 62 within the passage 54 controls the pressure of oil transmitted to the oil filter 25. The relief valve 62 prevents pressure from rising over a specified maximum pressure. Excess oil is directed back into the sump 38. Oil flows through the oil filter 25 and back through exit passage 56 into an annular passage 42 surrounding the input shaft 18. The input shaft 18 includes an inlet passage 58 in communication with the annular passage 42. Oil within the inlet passage 58 flows through the bore passages 44 along the axis of the input shaft 18. Several outlet passages 46 extend from the bore passage 44 to distribute oil to various heavy wear areas of the driveline (Figure 6, page 5 lines 14-24 to page 6, lines 1- 2, paragraphs 24-25).

Claim 1

Claim 1 recites an axle assembly 10 comprising an axle housing 12, a pump housing 16 attachable to cover an opening within the axle housing 12 and a pump 32 mounted within the pump housing 16. The pump housing 16 is required to include a cavity 40 defining a supply passage for communicating lubricant from a sump 38 within the axle housing 12 to the pump 32. Claim 1 further requires an input shaft 18 supported by the pump housing 16 and driving the pump 32 (Figure 6, page 4, lines 1-6, lines 14-22, paragraph 19-21).

Claim 24

Claim 24 recites an axle assembly 10 comprising an axle housing 12 including an opening for an input shaft 18 and a pump housing 16 attached to the axle housing 12 over the opening. Claim 24 requires a pump mounted within the pump housing 16 and driven by the input shaft 18. Claim 24 further requires a bearing member 30 supported within the pump housing 16 separate from the axle housing 12 for supporting rotation of the input shaft 18.

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

(1) Claims 1-3, 6, 9-11,22-24 and 27-29 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,468,981 to Ries ("Ries").

(2) Claims 1-6, 9-11, 22, and 24-28 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,770,005 to Aikawa et al. ("Aikawa").

(3) Claims 7 and 8 were rejected under 35 U.S.C. § 103(b) as being obvious over Ries as modified in view of U.S. Patent No. 5,311,740 to Shiba et al. ("Shiba").

ARGUMENT

(1) Claims 1-3, 6, 9-11,22-24 and 27-29 rejected as being anticipated by Ries.

Claim 1

The Examiner argues that Figure 5 discloses a pump housing with a cavity that defines a supply passage for communicating lubricant from a sump within the axle housing to the pump. Appellant disagrees, Reis discloses a plurality pressure lines for communicating lubricant to a pump and therefore does not disclose the required passage within the pump housing.

Claim 1 requires a cavity for communicating lubricant from a sump within the axle housing to the pump. The passages in the Reis pump housing are for attachment to the supply lines. The pump housing is not in communication with a sump. Further the Siebert cavity does not define a supply passage that is in communication with a sump. The features referenced by

the Examiner are simple connection points for the supply lines that carry lubricant to and from the oil pump. Appellant requests reversal of this rejection.

Claim 24

Claim 24 requires a bearing member supported within the pump housing separate from the axle housing for supporting rotation of said input shaft. The Examiner argues that Figure 5 discloses this feature. However, the claim limitation requires that the bearing member be supported within the pump housing separate from the axle housing. The Examiner reads Siebert elements 112, 114, and 115 as the pump housing. The element 115 is bolted to and extends into a differential carrier (30), and therefore is not supported separate from the axle housing as is required by claim 24. Instead, the bearing is supported within the differential carrier 30. For this reason, the disclosures in Ries cannot anticipate claims 24. Appellant requests reversal of this rejection.

Claim 27

Further, claim 27 is dependent from claim 24 and was also rejected as being anticipated by Ries. Claim 27 requires an inlet in communication with a sump within the axle housing and a cavity defining a supply passage within the pump housing from the inlet to the pump. The Ries device utilizes many oil lines to communicate lubricant to the pump and cannot be disposed within the pump housing as the claim requires. Claim 24 includes limitations that require the passage to extend within the pump housing from the inlet to the pump. The various lubricant lines do not extend within the pump housing and therefore cannot anticipate this limitation.

Claim 28

Additionally, claim 28 requires that the pump housing includes an elongated section including an inlet and the cavity that defines the supply passage. Reis does not disclose any such structure and therefore cannot anticipate claim 28. Accordingly, Appellant requests reversal of the rejection to claim 28.

(2) Claims 1-6, 9-11, 22, and 24-28 rejected as being anticipated by Aikawa.

Claim 1

Examiner argues that the two Aikawa axle housing parts 11 and 13, (Aikawa Figure 1) discloses the claimed axle housing and pump housing. It is appreciated that the Examiner is required to broadly interpret the claims, however such an interpretation cannot deviate from the interpretation expected of a worker skilled in the art. In this instance, the Aikawa reference discloses a combination gear casing part 11 and differential carrier 13 that are bolted together as shown in Figure 1 to define an internal space that supports several different axles and other driveline components. The Examiner is reading the differential carrier 13 as the claimed pump housing. Aikawa includes a pump 93 that is within the interior space defined by the bolted together but would not be interpreted as a pump housing as in addition to the pump, the carrier 13 supports at least three shafts, meshing gears and a clutch 81. Once skilled in the art most certainly would not interpret the differential carrier as the claimed pump housing.

Further, claim 1 includes the limitation that the pump housing is attachable to cover an opening within the axle housing. The differential carrier 13 can hardly be read as covering an opening as it defines a substantial portion of the shape and boundaries of the internal open space. Accordingly, the reading of item 13 as a pump housing is not proper as one skilled in the art would not understand the differential carrier as meeting the pump housing limitation.

In addition, claim 1 requires that the pump housing includes a cavity defining a supply passage for communicating lubricant from a sump within the axle housing to the pump. No such cavity or passage is disposed within the Aikawa differential carrier 13. Further, this feature would not be necessary in the Aikawa device as the pump is disposed completely within the internal space defined by the axle housing part an the carrier differential carrier 13. For these reasons Appellant requests reversal of the rejection to claim 1 as being anticipated by Aikawa et al.

Claim 24

Claim 24 requires a pump housing attached to an axle housing over an opening in the axle housing. For the same reasons as discussed above with regard to claim 1, the Aikawa et al reference cannot disclose this feature.

Further claim 24 requires a bearing member supported within the pump housing separate from the axle housing. As appreciated from Figure 1 of Aikawa et al. a bearing is supported within the inner space defined by the axle housing part 11 and the differential carrier 13. However, neither of these elements is a pump housing as would be recognized by a worker skilled in the art. Accordingly, Aikawa et al. cannot anticipate claims 24.

Claim 27

Claim 27 requires that an inlet is in communication with a sump within the axle housing and a cavity defining a supply passage within the pump housing from the inlet to the pump. The differential carrier 13 of Aikawa et al. does not disclose this feature as there is not cavity within the differential carrier 13 that meets this limitation.

Claim 28

As discussed above, claim 28 requires an elongated section that includes the inlet and the cavity recited in claim 27. The Aikiawa et al. device simply does not disclose any feature that can reasonably read to meet this limitation. For this reason Appellant requests reversal of this rejection.

(3) Claims 7 and 8 rejected as being obvious over Ries as modified in view of Shiba.

Claims 7 and 8 depend from an allowable base claim and are therefore also in allowable form.

CONCLUSION

For the reasons set forth above, the rejection of claims 1-11 and 22-29 is improper and should be reversed. Appellant earnestly requests such an action.

Respectfully Submitted,

CARLSON, GASKEY & OLDS, P.C.

/John M. Siragusa/

John M. Siragusa
Registration No. 46,174
400 West Maple Road, Suite 350
Birmingham, Michigan 48009
Telephone: (248) 988-8360
Facsimile: (248) 988-8363

Dated: October 29, 2007

CLAIMS APPENDIX

1. (PREVIOUSLY PRESENTED) An axle assembly comprising:

an axle housing;

a pump housing attachable to cover an opening within said axle housing;

a pump mounted within said pump housing, wherein said pump housing includes a cavity defining a supply passage for communicating lubricant from a sump within said axle housing to said pump; and

an input shaft supported by said pump housing and driving said pump.

2. (PREVIOUSLY PRESENTED) The assembly as recited in claim 1, wherein said pump supplies lubricant from said sump within said axle housing to a driveline component supported within said axle housing.

3. (ORIGINAL) The assembly as recited in claim 2, comprising an annular passage defined within said pump housing surrounding said input shaft.

4. (ORIGINAL) The assembly as recited in claim 2, wherein said input shaft comprises a lubricant passageway receiving lubricant from said pump.

5. (ORIGINAL) The assembly as recited in claim 4, wherein said lubricant passageway comprises at least one outlet passage for distributing lubricant.

6. (PREVIOUSLY PRESENTED) The assembly as recited in claim 1, comprising a bearing supporting rotation of said input shaft, said bearing mounted within said pump housing.

7. (ORIGINAL) The assembly as recited in claim 1, wherein said pump housing comprises a filter housing for attachment of a lubricant filter.

8. (PREVIOUSLY PRESENTED) The assembly as recited in claim 1, wherein said pump housing comprises a relief valve for controlling a lubricant pressure emitted from said pump.

9. (ORIGINAL) The assembly as recited in claim 1, wherein said pump comprises a rotor pump.

10. (ORIGINAL) The assembly as recited in claim 9, wherein said rotor pump comprises a reversing ring for directing oil flow in a first direction regardless of input shaft rotational direction.

11. (PREVIOUSLY PRESENTED) The assembly as recited in claim 1, wherein said pump housing includes a bearing cage supporting rotation of said input shaft, wherein said bearing cage is supported entirely within said pump housing independent of said axle housing .

12-21. (CANCELLED)

22. (PREVIOUSLY PRESENTED) The assembly as recited in claim 1, including a bearing cage disposed within said pump housing and spaced an axial distance from said axle housing.

23. (PREVIOUSLY PRESENTED) The assembly as recited in claim 1, including a pinion shaft supported within said axle housing and driven by said input shaft.

24. (PREVIOUSLY PRESENTED) An axle assembly comprising:

an axle housing including an opening for an input shaft;

a pump housing attached to the axle housing over said opening;

a pump mounted within said pump housing and driven by said input shaft; and

a bearing member supported within said pump housing separate from said axle housing for supporting rotation of said input shaft.

25. (PREVIOUSLY PRESENTED) The assembly as recited in claim 24, wherein said input shaft includes a lubricant passage for communicating lubricant into said axle housing.

26. (PREVIOUSLY PRESENTED) The assembly as recited in claim 25, wherein said lubricant passage comprise a first passage extending axially through said input shaft and a plurality of second passages in communication with said first passage that communicate lubricant outside said input shaft.

27. (PREVIOUSLY PRESENTED) The assembly as recited in claim 24, wherein said pump housing includes an inlet in communication with a sump within said axle housing and a cavity defining a supply passage within said pump housing from said inlet to said pump.

28. (CURRENTLY AMENDED) The assembly as recited in claim 27, wherein said pump housing includes an elongated section including said inlet and said cavity.

29. (PREVIOUSLY PRESENTED) The assembly as recited in claim 24, wherein said input shaft drives a pinion shaft supported for rotation within said axle assembly.

Evidence Appendix

None

Related Proceedings Appendix

None